

REMARKS

Claims 1-6, 9, 13-15, 22-27, 33-35, 39-41, 83 and 89-93 are pending in this application. Claims 13-15, 33-35 and 40-41 have been amended to clarify the subject matter of the claimed invention. No new matter has been introduced.

Claims 1, 9, 22, 39, 83 and 89-93 stand rejected under 35 U.S.C. §112, first paragraph, as containing “subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s) . . . had possession of the claimed invention.” (Office Action at 4). This rejection is respectfully traversed.

Although the grounds for Examiner’s rejection under 35 U.S.C. §112, first paragraph, are not clearly delineated,¹ Applicants note at the outset that claims 1, 9, 22, 39, 83 and 89-93 are original claims of this application filed on April 15, 1999, and as such are self supporting. Applicants also note that courts hold that an “original claim,” that is a claim contained in the patent specification when it is filed, complies with the invention description requirement of 35 U.S.C. §112. “[O]riginal claims constitute their own description. Later added claims of similar scope and wording are described thereby.” In re Koller, 613 F.2d 819, 823-24 (CCPA 1980) (See also Union Oil Co. of California v. Atlantic Richfield Co., 208 F.3d 989, 998 n. 4 (Fed. Cir. 2000) (“One of this court’s predecessor courts clarified that disclosure in an originally filed claim satisfies the written description requirement.”); In re Gardner, 480 F.2d 879, 880 (CCPA 1973) (“Under these circumstances, we consider the original claim in itself adequate ‘written description’ of the claimed invention. It was equally a ‘written description’ . . . whether located among the original claims or in the descriptive part of the specification.”)).

¹ In the October 24, 2003 Office Action, the Examiner simply quotes all language of claims 1, 9, 22, 39, 83 and 89-93. Accordingly, it is unclear to the Applicants what portion of the subject matter of these claims (the “consisting essentially of” language, the “non-aqueous composition of an alcohol and at least two inorganic acids” language, or the list of inorganic acids in these claims) fails to comply with 35 U.S.C. § 112, first paragraph.

In addition, Applicants submit that the specification of the present application reasonably conveys to one skilled in the art that the inventors had possession of the subject matter of claims 1, 9, 22, 39, 83 and 89-93. The specification discloses a non-aqueous composition of an alcohol and at least two inorganic acids. In the Detailed Description of the Preferred Embodiments, the specification describes that “[t]he selective etching composition according to the present invention includes an alcoholic component and an acidic component.” (Application at 7). The specification explains that “[t]he selective etching composition optimally includes a polyhydric alcohol or C₂-C₆ alcohol together with a combination of two or more acids.” (Application at 7). The specification further emphasizes that “[t]he selective etching composition of the present invention preferably includes a predominant amount of the alcohol and is also preferably formulated to be a non-aqueous composition, that is a non-water based composition.” (Application at 7). The specification lists “inorganic acids suitable for the present invention” as “those such as hydrofluoric acid, nitric acid, phosphoric acid, sulfuric acid, boric acid, carbonic acid, perchloric acid and sulfurous acid.” (Application at 8). Accordingly, and for at least the reasons above, Applicants submit that all pending claims are in full compliance with 35 U.S.C. § 112, first paragraph.

Claims 13-15 and 39-41 stand rejected under 35 U.S.C. §112, second paragraph, as “being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.” (Office Action at 6). In particular, the Examiner asserts that the “ratio of alcohol to a first acid to a second acid” in claims 13-15 and 39-41 “is indefinite for failing to specify the units if the ratio.” (Office Action at 6). Applicants point out that claims 13-15 and 39-41 have been amended to clarify that the ratio of alcohol to a first acid to a second acid is a “volume ratio.” Applicants submit that all pending claims are in full compliance with 35 U.S.C. § 112, second paragraph.

Claims 1-6, 22-27 and 83 stand rejected under 35 U.S.C. § 102 as being anticipated by Aoki et al. (U.S. Patent No. 5,336,425) (“Aoki”). This rejection is

The present invention relates to a non-aqueous etching mixture which consists essentially of an alcohol and at least two inorganic acids. As such independent claim 1 recites an “etching composition consisting essentially of: a non-aqueous composition of an alcohol and at least two inorganic acids.” Independent claim 1 also recites that “one of said inorganic acids is selected from the group consisting of sulfuric acid, boric acid, carbonic acid, perchloric acid and sulfurous acid.” Independent claim 22 recites an “etching composition consisting essentially of: a non-aqueous composition of an alcohol and at least two different inorganic acids selected from the group consisting of phosphoric acid, sulfuric acid, boric acid, carbonic acid, perchloric acid and sulfurous acid.” Independent claim 83 recites an “etching composition consisting essentially of: a non-aqueous composition of propylene glycol and at least two inorganic acids, wherein one of said inorganic acids is selected from the group consisting of hydrofluoric acid, phosphoric acid, sulfuric acid, boric acid, carbonic acid, perchloric acid and sulfurous acid.”

Aoki relates to an acidic aluminum cleaner that comprises “mineral acid, oxidant, polyvalent metal ions, and surfactant.” (Abstract). Aoki teaches that the stability of the acidic aluminum cleaner “is substantially improved by the presence in the cleaner of from 0.05 to 5 g/L of a component selected from the group of glycols containing from 2 to 10 carbon atoms per molecule and mixtures of such glycols.” (Abstract). In this manner, “[t]he effectiveness of the cleaner for primary cleaning and de-smutting of aluminum and its alloys is not impaired and may even be improved by the addition of the glycol component.” (Abstract).

Aoki does not disclose, teach or suggest all limitations of independent claims 1, 22 and 83. Aoki fails to disclose, teach or suggest an “etching composition consisting essentially of: a non-aqueous composition of an alcohol and at least two inorganic acids” (claim 1), an “etching composition consisting essentially of: a non-aqueous composition of an alcohol and at least two different inorganic acids” (claim 22) or an “etching composition consisting essentially of: a non-aqueous composition of propylene glycol and

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at least two inorganic acids" (claim 83). Aoki teaches an acidic aluminum cleaner comprising "a mineral acid" having "at least one selection from phosphoric acid, sulfuric acid, and nitric acid," an oxidant such as hydrogen peroxide or a nitrite, a polyvalent metal ion such as ferric ion, a surfactant, and "at least 1 selection from the C2 to C10 glycols such as propylene glycol, ethylene glycol, diethylene glycol, and triethylene glycol." (Col. 2, lines 6-23). Aoki fails to disclose an etching composition "consisting essentially of" an alcohol and at least two inorganic acids, as in the claimed invention.

Applicants point out that independent claims 1, 22 and 83 do not recite the fully open term "comprising," but rather the narrower phrase "consisting essentially of." Applicants further note that courts have consistently held that "[B]y using the term 'consisting essentially of,' the drafter signals that the invention necessarily includes the listed ingredients and is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention. A 'consisting essentially of' claim occupies a middle ground between closed claims that are written in a 'consisting of' format and fully open claims that are drafted in a 'comprising' format." Regents of Univ. of Calif. V. Eli Lilly & Co., 119 F.3d 1559, 1573 (Fed. Cir. 1997). Since the "consisting essentially of" limitation of claims 1, 22 and 83 is not described in Aoki, the present invention is not anticipated under 35 U.S.C. § 102 and withdrawal of the rejection of claims 1-6, 22-27 and 83 is respectfully requested.

Claims 13-15, 33-35 and 39-41 stand rejected under 35 U.S.C. § 103 as being unpatentable over Aoki in view of Uchida et al. (U.S. Patent No. 5,307,296) ("Uchida"). This rejection is respectfully traversed.

As noted above, the present invention relates to a non-aqueous etching mixture which consists essentially of an alcohol and at least two inorganic acids. As such independent claim 39 recites a "composition for etching doped polysilicon from a silicon substrate with high selectivity to undoped polysilicon consisting essentially of: a non-aqueous composition comprising propylene glycol, nitric acid and hydrofluoric acid in a volume ratio of propylene glycol to nitric acid to hydrofluoric acid from about 10-50:5-

40:1.”

Uchida relates to a “method of predicting the topography of a semiconductor workpiece after a plurality of manufacturing processes, such as etching and film deposition, are carried out on the workpiece.” (Abstract). Uchida teaches “specifying conditions, such as temperature and etchant concentration, for each process; establishing a plurality of points in a grid in a space including the workpiece; identifying the materials comprising the workpiece and the concentration of virtual particles representing the topography of the workpiece before a first process; using the modified diffusion model equation to predict the material and concentration of virtual particles after the completion of the first process in the sequence of processes; recording the material and virtual particle concentration at the completion of the first process as a decimal number including an integer part representing the material and a decimal part representing the concentration of virtual particles; and using the modified diffusion model to predict the materials and concentration of virtual particles after a second process beginning with the materials and virtual particle concentrations from the prediction of the first process.” (Abstract).

The subject matter of claims 13-15, 33-35 and 39-41 would not have been obvious over Aoki in view of Uchida. Specifically, the Office Action fails to establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness, three requirements must be met: (1) some suggestion or motivation, either in the references themselves or in the knowledge of a person of ordinary skill in the art, to modify the reference or combine reference teachings; (2) a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations. More importantly, the teaching or suggestion to make the claimed combination and the reasonable expectation for success must both be found in the prior art and not based on Applicant’s disclosure. See, e.g., In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974).

In the present case, Aoki and Uchida, whether considered alone or in combination, fail to teach or suggest all limitations of independent claims 1, 22 and 39. As

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noted above, Aoki fails to disclose, teach or suggest an “etching composition consisting essentially of: a non-aqueous composition of an alcohol and at least two inorganic acids” (claim 1) or an “etching composition consisting essentially of: a non-aqueous composition of an alcohol and at least two different inorganic acids” (claim 22). Aoki also fails to disclose, teach or suggest a “composition for etching doped polysilicon from a silicon substrate with high selectivity to undoped polysilicon,” much less a “composition for etching doped polysilicon from a silicon substrate with high selectivity to undoped polysilicon consisting essentially of: a non-aqueous composition comprising propylene glycol, nitric acid and hydrofluoric acid in a volume ratio of propylene glycol to nitric acid to hydrofluoric acid from about 10-50:5-40:1,” as independent claim 39 recites. The crux of Aoki is an aluminum cleaner containing a mineral acid, an oxidant, a metal ion, a nonionic surfactant and a glycol, and not a composition that consists essentially of an alcohol and at least two inorganic acids, as in the claimed invention.

In addition, Applicants note that Uchida does not disclose any of the limitations of independent claims 1, 22 and 39. In fact, Uchida teaches “workpiece topography prediction methods,” and not etching mixtures, much less etching mixtures which are non-aqueous and which consist essentially of an alcohol and at least two inorganic acids, as in the claimed invention.

Applicants further note that a person of ordinary skill in the art would not have been motivated to combine the teachings of Aoki with those of Uchida. As noted above, one requirement for establishing a *prima facie* case of obviousness is that there must be some suggestion or motivation, either in the references themselves or in the knowledge of a person of ordinary skill in the art, to modify the reference or combine reference teachings. Courts have generally held that “[I]t is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor.” Northern Telecom, Inc. v. Datapoint Corp., 908 F.2d 931, 934 (Fed. Cir. 1990). This way, “the inquiry is not whether each element existed in the prior art, but

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whether the prior art made obvious the invention as a whole for which patentability is claimed.” Hartness Int'l, Inc. v. Simplimatic Engineering Co., 819 F.2d 1100, 1108 (Fed. Cir. 1987). Accordingly, a determination of obviousness “must involve more than indiscriminately combining prior art; a motivation or suggestion to combine must exist.” Pro-Mold & Tool Co., 75 F.3d at 1573.

In the present case, a person of ordinary skill in the art would not have been motivated to combine the teachings of Aoki with those of Uchida. The crux of Aoki is an “acidic aluminum cleaner” which is stabilized by the addition of a glycol and which cleans “articles, such as sheets, strips, containers, and the like, that are made of aluminum.” (Col. 1, lines 7-9). Aoki teaches that the stabilized acidic aluminum cleaner overcomes problems of the prior aluminum cleaners, such as increased surfactant decomposition, increased consumption of the surfactant and decomposition products remaining in the treatment bath. On the other hand, the crux of Uchida is a method of predicting the topography of a workpiece by using a modified diffusion model equation. Thus, it is clear that Aoki and Uchida do not even have a substrate as a common element, as Aoki relates to an aluminum article whereas Uchida relates to a semiconductor workpiece. For at least these reasons, the subject matter of claims 13-15, 33-35 and 39-41 would not have been obvious over Aoki in view of Uchida, and withdrawal of the rejection of these claims is respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

By 

Thomas J. D'Amico
Registration No.: 28,371
Gabriela I. Coman
Registration No.: 50,515
DICKSTEIN SHAPIRO MORIN &
OSHINSKY LLP
2101 L Street NW
Washington, DC 20037-1526
(202) 785-9700
Attorneys for Applicant